

NEW SPECIES OF *CHOREBUS* (HYMENOPTERA: BRACONIDAE) FROM THE IBERIAN PENINSULA¹

I. Docavo², M. Fischer³, J. Tormos⁴

ABSTRACT: *Chorebus tergo flavus*, *C. petiobrevis*, and *C. longiventris*, three new species of Braconidae from Spain, are described and compared with allied species of the genus. Identification keys and Illustrations of the most important features are included.

Among Braconidae, the subfamily Alysiinae is characterized by having exodont mandibles (a condition in which the mandibles are twisted so that they are directed outwards apically and do not overlap when are closed), and all species are exclusively endoparasitic on cyclorraphous Diptera. Alysiinae are divided into two tribes: Alysiini and Dacnusini, based on the presence or absence of the r-m cross vein in the forewing.

With approximately 215 Holarctic species, *Chorebus* Haliday is the most widespread genus in Dacnusini. With the exception of *Chorebus gracilis* (Nees von Esenbeck, 1834), which attacks *Psila rosae* (F.) (Diptera, Psilidae), all known *Chorebus* attack Agromyzidae and Ephydriidae (Diptera). Most *Chorebus* are easily recognized by densely pubescent metapleura, with the setae often arranged in rosettes of radiating hairs.

Data about imagos of Dacnusini, both at the morphological and biological level, can be found in Griffiths (1964, 1966, 1968, 1984) and Tobias (1986, 1995).

Here, three new species of *Chorebus*: *Chorebus tergo flavus* sp. nov., *C. petiobrevis* sp. nov., and *C. longiventris* sp. nov., discovered in the Iberian Peninsula (Spain), are described.

MATERIAL AND METHODS

The specimens were obtained with an insect net or from their hosts. In the latter case portions of plant organs with agromyzid larvae were collected; the larvae were in an advanced stage or in the pupal phase and were stored in Fahringer boxes. These boxes, which were kept under condition of ambient temperature and humidity, were checked every three days for the emergence of hosts and parasitoids.

For the descriptions and illustrations, a zoom WILD M8 stereoscopic mi

¹ Received July 5, 2000. Accepted September 16, 2000.

² Departamento de Biología Animal, Biología Celular y Parasitología. Facultad de Biología. Universidad de Valencia. C/ Dr. Moliner, 50. Burjasot (Valencia). Spain.

³ Naturhistorisches Museum Wien. Zweite Zoologische Abteilung (Insekten). PN 2155 96 2Z. Burgring 7, A-1014. Wien. Postfach 417. Austria.

⁴ Unidad de Zoología. Facultad de Biología. Universidad de Salamanca. 37071-Salamanca. Spain.

roscope was used; this was equipped with an Olympus FLQ 85E cold light source to which a 1.35 x drawing tube was attached. Measurements were made essentially following the methodology used by Griffiths (1964) and Wharton (1977).

The terminology used for the different morphological structures (body and wing venation), as well as the methodology employed for the collection of biometric data essentially follow those of Griffiths (1964), Wharton (1977, 1986, 1991), and Achterberg (1993). The concept of *Chorebus* followed is that established by Griffiths (1968).

Chorebus tergoflavus SP. NOV.

Female: Head (Figs. 1, 2) - Transverse, 1.7 times wider than long, 1.2 times higher than long. Occiput bare and shiny. Vertex with numerous long and scattered setae arranged in rows. Ocelli small, not at all protruding, the distance between them twice as large as their diameter. In frontal view, eyes not convergent from below; 1.4 times as long antero-posteriorly as temples. From dorsal view, temples not widened behind eyes. Face 1.2 times wider than long. Antennae as long as body, with 20 antennomeres; flagellomere 1, flagellomere 2, 3 times longer than broad; apical flagellomere 2 times longer than broad. Mandibles (Fig. 2) with some scattered setae at base, widened towards apex, 0.8 times length of head, 4-toothed, with 1st tooth clearly widened, 2nd tooth wide, short and pointed and 3rd and 4th teeth well differentiated, although small. Maxillary palpi not longer than height of head. Labial palpi short, as in *C. rufimarginatus* (Stelfox, 1954).

Mesosoma (Figs. 3, 4) - 1.3 times longer than high, 2 times longer than broad between tegulae, upper side convex. Pronotum bare and shiny; anterior oblique suture broad and rough, with few setae. Mesoscutum with whitish and scattered pubescence on anterior face, central lobe and along the imaginary line of notauli; lateral lobes almost bare; dorsal pit of mesoscutum short, oval, and shallowly impressed; notauli weakly impressed anteriorly, not visible on mesoscutal disc. Prescutellar furrow crenulate. Mesopleuron rough, especially on anterior upper third; sternaulus nearly complete, narrow, weakly crenulate; posterior mesopleural furrow smooth. Metapleuron with poorly defined swelling, with rosette of setae slightly differentiated, atypical, resembling that of *C. canariensis* Griffiths, 1967, with long setae pointing towards the coxa. Propodeum rough, with abundant pubescence, although not very dense (Fig. 3). Hind coxae shiny, with a few slightly visible and scattered setae. Hind femora 5 times longer than broad.

Wings (Fig. 4) - Pterostigma with sides almost parallel, distally gradually merging into the metacarpus, 1.8 times longer than metacarpus; metacarpus ending far from apex of wing. 1st radial segment 0.7 times shorter than length between its insertion and the parastigma and as long as width of pterostigma; rest of radius weakly curved, not sinuate. Radial cell short, ending before the tip of wing. Recurrent vein clearly antefurcal. 3rd discoidal segment incomplete. Brachial cell open on lower distal angle. Length of forewing: 1.5 mm.

Metasoma - Petiole 1.5 times longer than broad at apex, granulose medially, smooth and shiny at apical angles, almost bare with only a few scattered setae. Tergum 2 and 3 nearly bare, shiny, with a few setae arranged in a row where the joint between the two terga should be situated. Ovipositor short, as in *C. rufimarginatus*, hidden by abdomen from dorsal view; its sheaths with pubescence.

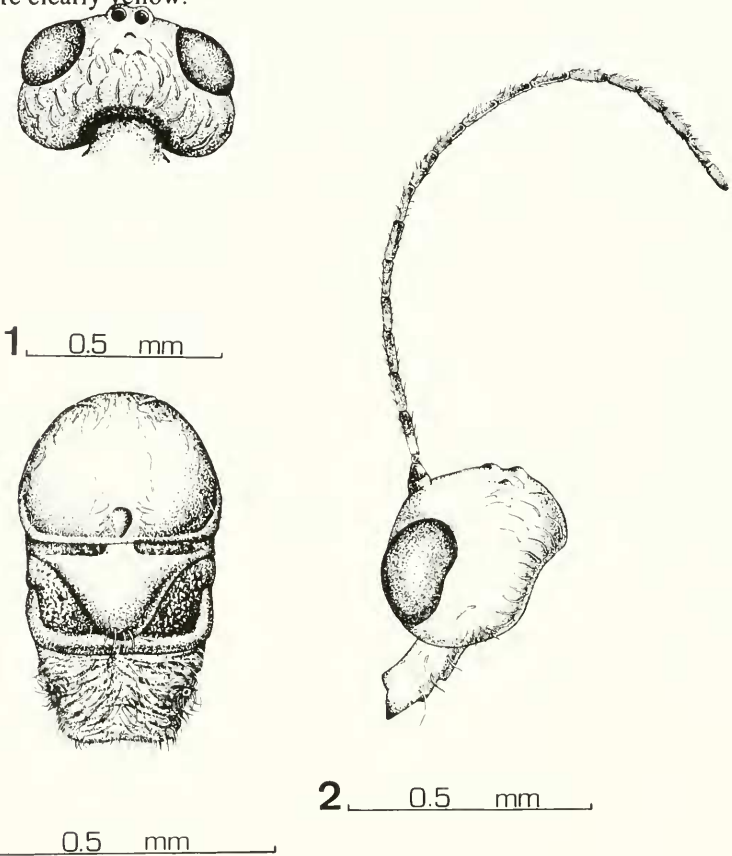
Color and size - Black, with exception of: pedicel of antennae (yellow); center of mandibles (orange); maxillary and labial palpi (yellowish-brown); coxae (yellowish-red), tibiae and femora (brown-orange) of all legs; tergum 2 and 3 (intensely yellow). Length

of body: 1.32 mm. Length of mesosoma: 0.55 mm. Wing span: 3.32 mm.

Male: unknown. **Host:** unknown.

Material examined [deposited in the private institution Fundación Entomológica "Torres-Sala" (Docavo Collection) (Valencia, Spain)]: 2 females. Holotype: female, SPAIN: Valencia: Alberique, 10-IV-65 (leg. I. Docavo). Paratype: 1 female, SPAIN: Valencia: Alberique, 10-IV-65 (leg. I. Docavo).

Etymology: The specific name refers to tergum 2 and 3 of the metasoma which are clearly yellow.



Figures 1-3.- *Chorebus tergoflavus* sp. nov. (female).- 1, Head in posterior view showing pubescence of vertex and of occiput; 2, Head in lateral view showing temple, antenna and mandible; 3, mesosoma in dorsal view.

Note: This new species belongs to the "*Chorebus ovalis/lateralis* complex" (Griffiths, 1968), and is similar to *C. rufimarginatus*, from which it is distinguished by the following characters: 1) head not broadened behind eyes; 2) clypeus completely black, not red at apex; 3) notauli very underdeveloped, only visible anteriorly; 4) midpit not continuing through disc via a furrow; 5) sternaulus narrow, shallow and finely crenulate; 6) metapleuron with weakly developed rosette; 7) petiole 1.8 times longer than wide, without ridges converging and joining to form a medial carina, granulose at center, smooth and shiny, especially at apical angles, very slightly pubescent; 8) tergum 2 and 3 clearly yellow, contrasting with the black coloration of the rest of the metasoma.

This species can be accommodated in the key of Griffiths (1968; p. 123) as follows:

- 20 Petiole almost parallel-sided, twice as long as wide, bare centrally but with some pubescence near its base, along its sides and towards its apical corners (Nixon, 1943, fig. 54). 29 antennal segments (female) *C. iphias* (Nixon)
- Petiole widened towards its apex, about 1.5 times as long as wide, almost bare and shiny or with evenly distributed pubescence 20a
- 20a Antennomeres: female 25-26; male 29. Petiole with pubescence distributed regularly *C. rufimarginatus* (Stelfox)
- Antennomeres: female 20. Petiole granulose at center; without central ridge; almost bare, although with some very scattered setae; smooth and shiny at apical angles. Tergum 2 and 3 yellow, contrasting with the dark hue of the rest of the metasoma *C. tergoflavus* sp. nov.

In the key of Tobias (1995; p. 285), it will key as follows:

- 50(53) Legs dark brownish yellow, sometimes lighter, almost orange.
- 51(51a) First abdominal tergite broadened toward apex, 1.5 times as long as its width at apex. Antennae with 25-26 antennomeres (in male with 29 antennomeres), as long as body, apical antennomeres 1.5 times as long as wide. Head massive, broadened behind eyes. First denticle on mandible distinctly deflected sideward, 3rd and 4th denticles obtuse. Notaulices distinct, sculptured. First abdominal tergite with longitudinal keel. Propodeum with numerous white setae. Body 2.5. West; British Isles *C. (S.) rufimarginatus* Stelfox
- 51a(51) Antennae of female with 20 antennomeres; apical antennomere twice as long as broad. Head not broadened behind eyes. Notauli not extending over main portion of mesonotal disc. Length of body: 1.3 mm. Spain.
..... *C. (S.) tergoflavus* sp. nov.

Chorebus petiobrevis SP. NOV.

Female: Head - Transverse, 1.4 times wider than long, 1.1 times higher than long. Length of head 3.1 times width of mandibles. Vertex and dorsal zone of occiput with scattered setae arranged in rows. Ocelli small, protruding, the distance between them 1.5 times as large as their diameter. Eyes not converging from below and twice as long as temples. Temples not very broadened behind eyes. Face 1.1 times broader than high. Antennae with 24 antennomeres, with pubescence, neither dense nor scant; flagellomere 1, 2 times longer than broad; apical flagellomere 1.3 times longer than broad. Mandibles with an

accumulation of setae at base, bearing slightly more setae than the occiput, not forming a tuft; mandible length 0.3 times head length; 4-toothed, with 1st tooth slightly widened and 2nd slightly longer than 3rd and 4th teeth. Maxillary palpi not longer than height of head. Labial palpi as in *C. leptogaster* (Haliday, 1839).

Mesosoma - 1.4 times longer than high, 2 times longer than broad between tegulae, upper side slightly convex. Pronotum smooth and shiny; anterior oblique suture with dense pubescence that almost conceals its rough surface; rest of pronotum almost bare, with only a few scattered setae. Mesoscutum pubescent, with the exception of a reduced portion of the outer posterior part of the lateral lobes, which are bare; dorsal pit of mesoscutum well defined; notauli very faintly depressed. Prescutellar furrow crenulate. Mesopleuron smooth, shiny, almost bare, with setae only below humeral callus and a patch of pubescence close to the insertion of the middle coxae; sternaulus complete, long, narrow and finely crenulate throughout; posterior mesopleural furrow smooth; metapleural rosette well defined, typical of the "*Chorebus senilis*" group sensu lato (Griffiths, 1967), with a poorly defined swelling with punctation conferring a rough aspect. Propodeum rough, pubescent, with flattened setae over most of surface that fail to hide its rugosities. Hind coxae with a tuft of setae. Hind femora 3.5 times longer than broad. Hind tarsus equal to length of tibia.

Wings - Pterostigma elongate, narrow, parallel sided, narrowed at apex, 1.5 times longer than metacarpus; metacarpus ending far before apex of wing. 1st segment of radius 0.5 times shorter than length between its insertion and parastigma and as long as width of pterostigma; radius scarcely sinuate. Recurrent vein clearly antefurcal. Brachial cell almost closed at posterior distal angle. Length of wing: 1.8 mm.

Metasoma (Fig. 5) - Petiole 2.2 times longer than broad at apex; strongly granulose and rough throughout, except apical angles which are smooth and shiny; with setae on basal area which is extended to center and on part of sides, where they are long and fine; the rest bare. Metasoma beyond petiole 2 times longer than petiole. Ovipositor not projecting beyond apex of metasoma, curved upwards in lateral view.

Color and size - Head black, with the exception of: labrum and palpi (yellowish-brown) and center of mandibles (orange). Mesosoma black, except legs, which are yellowish-brown, except coxae (dark brown) of middle legs and coxae (black), trochanters and trochantellus (yellowish-brown), femora (black), base of tibiae (brown-dark red) and tarsi (brown-dark) of back legs. Metasoma beyond petiole yellowish-orange, with apex brown-dark red. Length of body: 2.12 mm. Length of mesosoma: 0.78 mm. Wing span: 3.98 mm.

Male: Essentially similar to female but with longer antennae, with 27-30 antennomeres. Length of body: 2.45 mm. Length of mesosoma: 0.78 mm. Wing span: 4.61 mm.

Host: *Chromatomyia horticola* (Goureau, 1851) (Agromyzidae).

Material examined [deposited in the private institution Fundación Entomológica "Torres-Sala" (Docavo Collection) (Valencia, Spain)]: 1 female, 3 males. Holotype: female, SPAIN: Valencia: Gandia, 3-IV-60 (leg. I. Docavo). Paratypes: 3 males, SPAIN: Valencia: Gandia, 3-IV-60 (Leg. I. Docavo).

Etymology: The specific name refers to the short petiole.

Note: The systematic position is discussed under *C. longiventris* sp. nov.

Chorebus longiventris SP. NOV.

Female: This new species appears very similar to *C. petiobrevis*, but can be distinguished by the following characters:

Head - Transverse, 1.7 times wider than long, 1.4 times higher than long, upper side convex. Length of head 2.5 times width of mandibles. Ocelli very small, the distance between them 2.5x as great as their diameter. Patch of setae of the base of mandibles more dense.

Mesosoma - 1.6 times longer than high, 1.8 times longer than broad between tegulae. Mesoscutum less setose, lateral lobes being almost bare, with only a few scattered setae; notauli only visible anteriorly. Prescutellar furrow not crenulate. Hind femora 4 times longer than broad. Length of wing: 2.02 mm.

Metasoma (Fig. 6) - Petiole 3 times longer than broad at apex; Metasoma beyond petiole 2.9 times longer than petiole. Ovipositor projecting, in retracted position, beyond last tergum of metasoma by the same length as that of the third tarsomere of the hind tarsus.

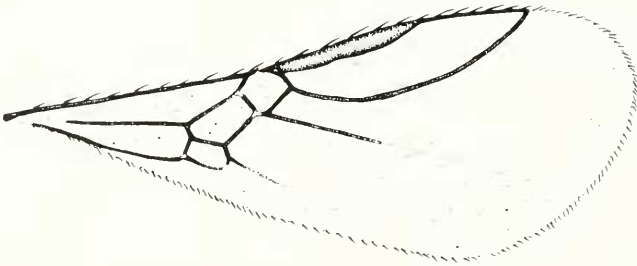
Color and size - Legs with all coxae and femora black; tibiae yellowish-orange on basal 2/3 of length, apical 1/3 dark. Length of body: 2.42 mm. Length of mesosoma: 0.90 mm. Wing span: 4.46 mm.

Male: unknown. **Host:** *Chromatomyia horticola* (Goureau) (Agromyzidae).

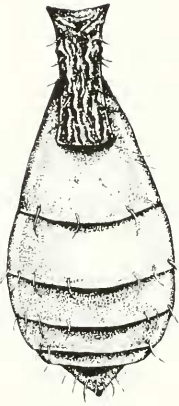
Material examined [deposited in the private institution Fundación Entomológica "Torres-Sala" (Docavo Collection) (Valencia, Spain)]: 2 females. Holotype: female, SPAIN: Valencia: Gandia, 3-IV-60 (Leg. I. Docavo). Paratype: 1 female, SPAIN: Valencia: Gandia, 3-IV-60 (Leg. I. Docavo).

Etymology: The specific name refers to the length of the portion of the metasoma beyond the petiole (gaster according to Wharton, 1977, 1986, 1991).

Notes: *C. petiobrevis* and *C. longiventris* belong to the group of *C. petiolatus* (Griffiths, 1967), which are closely related to each other as well as to *C. leptogaster* and differ from *C. leptogaster* by the following characters: **A)** Differences between *C. petiobrevis* and *C. leptogaster*: 1) head less transverse (length/head width = 1.4 (*C. petiobrevis*), 1.8 (*C. leptogaster*) and less high relative to length (length/height of head = 1.1. (*C. petiobrevis*), 1.5 (*C. leptogaster*); 2) vertex with setae arranged in rows; 3) posterior part of head more setose; 4) antennae with 24 antennomeres; 5) labrum yellowish-brown; 6) center of mandibles red-orange; 7) lateral lobes of mesoscutum more setose, the pubescence lacking only on a small portion of the posterior angles; 8) hind femora and tibiae almost black, a vaguely red hue only visible on a short portion of the base of the tibiae; 9) petiole 2.2 times longer than apical width. The presence of such a short petiole would appear to link this species with *C. heringianus* Griffiths 1967 (in *C. leptogaster* it is from 3 to 3.5 times longer), but in the broad pubescence of the mesonotum of *C. Petiobrevis* it more closely resembles to *C. leptogaster*; 10) metasoma beyond petiole bright orange; 11) body length greater than that of wing. In *C. leptogaster* the body length is at most 0.9 times that of the wings. **B)** Differences between *C. longiventris* and *C. leptogaster*: 1) mesoscutum less pubescent: most of the central lobe and lateral lobes with only a few scattered setae; granulose; 2) notauli only distinguishable on anterior part; 3) legs 1 and 2 lighter orange, with coxae darker, brown-dark red, with only last tarsomere black; hind legs with only the trochantellus lighter, brown-reddish, tibiae reddish-yellow on 2/3 of exten-



4. 0.5 mm



5. 0.5 mm



6. 0.5 mm

Figures 4-6.- *Chorebus tergoflavus* (female).- 4, Anterior right wing. *Chorebus petiobrevis* sp. nov. (female).- 5, Metasoma. *Chorebus longiventris* sp. nov. (female).- 6, Metasoma.

sion, only apical 1/3 dark, like whole of tarsus; 4) petiole long, 3 times as long as broad apically, with parallel sides, scantily pubescent and shiny; 5) metasoma beyond petiole longer, 2.9 times as long as petiole, of a darker reddish-brown than legs; 6) Ovipositor projecting beyond apical tergite by length of third tarsomere of hind tarsi.

These two species can be inserted in the key of Griffiths (1967; p. 664) as follows:

- 22 Petiole extraordinarily elongate, 3-3.5 times as long as wide -except in *C. petiobrevis* sp. nov. in which the petiole is 2.2. times longer than wide-. Back of head more or less bare centrally, pubescent only at its sides (near the mandibles) (*petiolatus* group) 23
- Petiole not so elongate, less than three times as long as wide -except *C. petiobrevis* included in anterior couplet- 26
- 23 Very large species, about 5 mm long. Antennal segments: male, 45-51; female: 43-45. Tooth 1 of mandible much expanded. Ovipositor (female) not projecting beyond the apical tergite in the retracted position . . *C. petiolatus* (Nees)
- Smaller species (up to 2.8 mm long). Not more than 33 antennal segments. Tooth 1 of mandibles hardly expanded (fig. 163). Wing with pterostigma and cell 2R₁ relatively short (fig. 148 and Tobias, 1962, fig. 48) 24
- 24 Coxae yellow. Gaster beyond petiole conspicuously yellow or yellow-brown. Ovipositor (female) projecting beyond the apical tergite in the retracted position *C. xiphidius* Griffiths
- Coxae black, brown or yellow-brown. Gaster beyond petiole varying from reddish yellow to black 25
- 25 Cheeks somewhat projecting, with distinct tufts of pubescence above the base of the mandibles. Hind femora strongly thickened (Tobias, 1962, fig. 49) (female unknown) *C. femoratus* (Tobias)
- Cheeks not projecting, with only fine inconspicuous pubescence near the base of the mandibles. Hind femora not so strongly thickened 25a
- 25a Petiole 3-3.5 times longer than wide; labrum black; palpi long; base of hind tibiae brown-dark red, very much lighter than rest. Metasoma beyond petiole 2.3 times longer than petiole, reddish-yellow to almost black. Ovipositor very short, hidden *C. leptogaster* (Haliday)
- Petiole 2.2 times longer than wide; labrum yellowish-brown; palpi short; base of hind tibiae darker, almost no lighter than rest. Metasoma beyond petiole 2 times longer than petiole, yellowy-orange, contrasting strongly with the rest of body. Ovipositor short, hidden in dorsal view. *C. petiobrevis* sp. nov.
- Petiole 3 times longer than wide; labrum yellowish-brown; palpi short; base of hind tibiae yellowy-orange on basal 2/3, apical 1/3 dark. Metasoma beyond petiole 2.9 times longer than petiole, brown-dark red. Ovipositor projecting beyond apical tergite by a length equal to that of third tarsomere of hind tarsi *C. longiventris* sp. nov.

The two new species can also be accommodated in the key of Tobias (1986; p. 332) as follows:

- 423a(422b) Hind femora not thickened, widest in apical third, slightly sculptured on outer side, lustrous, dark brown, rarely very dark brown.
- 423b(423a) Petiole 3-3.5 times longer than wide; labrum black; palpi long; base of hind tibiae brown-dark red, very lighter than rest. Metasoma beyond petiole 2.3 times longer than petiole, reddish-yellow to almost black. Ovipositor very short, hidden *C. leptogaster* (Haliday)
- 423c(423d) Petiole 2.2 times longer than wide; labrum yellowish-brown; palpi short; base of hind tibiae darker, almost no lighter than rest. Metasoma beyond petiole 2 times longer than petiole, yellowy-orange, contrasting strongly with the rest of body. Ovipositor short, hidden in dorsal view *C. petiobrevis* sp. nov.
- 423d(423c) Petiole 3 times longer than wide; labrum yellowish-brown; palpi short; base of hind tibiae yellowy-orange on basal 2/3, apical 1/3 dark. Metasoma beyond petiole 2.9 times longer than petiole, brown-dark red. Ovipositor projecting beyond apical tergite by a length equal to that of third tarsomere of hind tarsi *C. longiventris* sp. nov.

ACKNOWLEDGMENTS

Financial support for this paper was provided by the Junta de Castilla y León (project SA 18/96), and Fundación Entomológica "Torres-Sala".

LITERATURE CITED

- Achterberg, C. van 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera, Ichneumonoidea). Zool. Verh. Leiden, 283: 189 pp.
- Griffiths, G.C.D. 1964. The Alysiinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). I. General questions of taxonomy, biology and evolution. Beitr. Entomol. 14: 823-914.
- Griffiths, G.C.D. 1967. The Alysiinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). IV. The parasites of *Hexomyza* Enderlein, *Melanagromyza* Hendel, *Ophiomyia* Brashnikov and *Napomyza* Westwood. Beitr. Ent. 17: 653-696.
- Griffiths, G.C.D. 1968. The Alysiinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). VI. The parasites of *Cerodontha* Rondani s.l. Beitr. Ent. 18: 63-152.
- Nixon, G.E.J. 1943. A revision of the European Dacnusiini (Hym., Braconidae, Dacnusiinae). Ent. mon. Mag. 79: 20-34, 159-168.
- Tobias, V.I. 1986. Identification key for the insects of the European part of the USSR. Vol. III. Part V. Hymenoptera, Braconidae. pp. 100 - 105 (key for genera of Alysiinae), 163 - 221 (Dacnusiini).- Akademia Nauk: Leningrad (in Russian, transl. 1995 in English).
- Wharton, R.A. 1977. New World *Aphaereta* species (Hymenoptera: Braconidae) with a discussion of terminology used in the tribe Alysiini. Ann. Entomol. Soc. Am. 70: 782-803.
- Wharton, R.A. 1986. The braconid genus *Alysia* (Hymenoptera): a description of the subgenera and a revision of the subgenus *Alysia*. Syst. Entomol. 11: 453-504.
- Wharton, R.A. 1991. Revision of Australian Dacnusiini (Hymenoptera: Braconidae: Alysiinae), parasitoids of cyclorrhaphous Diptera. J. Aust. Entomol. Soc. 30: 193-206.